第 42 卷　第 2 期
2004 年 4 月
古 脊 椎 动 物 学 报
VERTEBRATA PALASIATICA
pp. 130～143
figs. 1～5

甘肃党河下游地区早渐新世哺乳动物化石的发现[1)]

王伴月　邱占祥
(中国科学院古脊椎动物与古人类研究所　北京　100044)

摘要: 描述了产于党河下游地区的狍牛泉组下部地层中的叮当沟哺乳动物群。化石共计 11 属 14 种: *Palaeoscaptor* cf. *P. acridens*、*Palaeoscaptor* sp.、*Oligosciurus dangheensis* gen. et sp. nov.、*Tataromys* cf. *T. sigmodon*、*Karakoromys decessus*、*Coelodontomys asiaticus*、*Parasminthus* spp.、Cricetidae gen. et sp. indet.、*Desmatolagus gobiensis*、*D. pusillus*、*Allacerops* sp.、*Schizotherium ordosium* 和 *Parabrachyodus* sp.。党河鲜松鼠(新属、新种)的主要特征是个体较小而原始,下颌骨咬肌窝前缘达 m2 下方;冠状突前缘近于垂直,起于 m2 后部下方,颊齿齿冠很低,臼齿具明显的下内尖、下次脊和下中附尖,但无下中尖。上述化石的已知时代分布表明,狍牛泉组下部的叮当沟哺乳动物群的时代为早渐新世。

关键词: 甘肃省党河地区, 渐新世, 哺乳动物
中图法分类号: Q915.873　　**文献标识码**: A　　**文章编号**: 1000 - 3118(2004)02 - 0130 - 14

甘肃省西部的党河流域是亚洲古近纪的经典地区之一。早在 20 世纪 30 年代初,瑞典人 Bohlin 就对党河地区新生代地层进行了考察。党河下游地区,即 Bohlin (1942, 1946) 的 Taben-buluk (蒙语塔奔布鲁克,汉译为五个泉子) 地区,包括西水沟、铁匠沟、燕丹图和五个泉子等地。因 Taben-buluk 地点的岩层出露不好,产的化石很少,而且 Bohlin (1942, 1946) 所报道的产自 Taben-buluk 地区的化石,实际上主要产自上述前 3 个地点,故笔者不再用"Taben-buluk 地区"这一名称。Bohlin 认为这些化石,除了极少数可能是中新世的外,绝大多数都是晚渐新世的,因此党河下游地区一直被作为亚洲晚渐新世的经典地区,上渐新统也被认为是该地区最早的新生代地层(Bohlin, 1942, 1945, 1946, 1960; Li and Ting, 1983; 童永生等, 1995; 王伴月, 1997a)。

1999 年和 2001 年中国科学院古脊椎动物与古人类研究所、甘肃省考古所和甘肃省博物馆共同组队对该地区进行了考察。我们不但发现了更多的哺乳动物化石,确认了产化石的确切地点和层位,区分出代表不同时代的地层,而且对该地区的新生代地层有了若干新的认识(王伴月等, 2003; Wang et al., 2003)。其中早渐新世哺乳动物化石的发现,在党河下游地区还是首次。尽管发现的化石还很少,而且标本保存得也不很好,但这一发现确认了该地区有下渐新统的存在。这表明该地区在新生代时接受沉积的时间比原来预计的要早,至少在早渐新世时已有沉积。本文是对该地区所产的早渐新世哺乳动物化石的描述和讨论。

---

1) 国家自然科学基金重点项目(编号:40232023)和国家自然科学基金项目(编号:49872011)资助。
收稿日期: 2003 - 09 - 16

描述所用术语和颊齿的测量方位,猬形目依 Rich (1981) ,松鼠科依邱铸鼎(1996) ,梳趾鼠科依 Wang (1997b) 。测量以毫米为单位。颊齿测量中 L 为长,W 为宽,AW 为前宽,PW 为后宽。文中缩写:IVPP 为中国科学院古脊椎动物与古人类研究所,IVPP V 为中国科学院古脊椎动物与古人类研究所脊椎动物化石编号;IVPP Loc. 为中国科学院古脊椎动物与古人类研究所野外地点编号。DH 代表党河地区。化石均产自甘肃省阿克塞哈萨克族自治县铁匠沟(见王伴月等,2003,图 1) 。

1　化石记述

猬形目 Order Erinaceomorpha Gregory, 1910

刺猬科 Erinaceidae Fischer de Waldheim, 1817

小峰古鼩鼹(相似种) *Palaeoscaptor* **cf.** *P. acridens* **Matthew et Granger, 1924**

(图 1,A)

标本　左 M1(IVPP V 13554.1) ,和部分右 P3 和左 P4 各 1 枚(V 13554.2～3) 。

地点和层位　IVPP Loc. DH 200102;早渐新世狍牛泉组下部。

记述　上述标本中仅 M1 (V 13554.1) 保存较好。M1 冠面宽大于长。前尖很高,具很弱的前脊。其后脊较发达,与后尖前脊连成一直线。后尖后脊很发达,伸至较发达的后附尖。V 形原尖的前、后脊分别伸达前小尖和后小尖。前小尖明显,为 V 形。后小尖比前小尖发达,也为 V 形。次尖位于原尖之后,有脊与原尖后脊连。齿带在齿的前缘内半部、后缘的外部和颊侧发育,舌侧无。P3 和 P4 均只保存了颊部。前尖高耸,明显的前尖后脊在 P3 较小,在 P4 较发达。党河的 M1 在比例上较短宽和具明显的前小尖等特征上与 *Palaeoscaptor acridens* 的相似,而与 *Amphechinus* 的不同。但它的尺寸(L ×AW ×PW: 1.8 ×2.2 ×2.4) 较 *P. acridens* 正型标本小,后尖颊侧较少向外凸,齿带发育较弱。暂作为 *P. acridens* 的相似种。

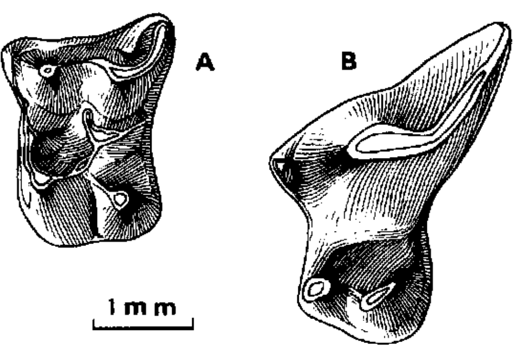


图 1　古鼩鼹颊齿冠面

Fig. 1　Occlusal view of cheek teeth of *Palaeoscaptor*

A. 小峰古鼩鼹(相似种) (*P.* cf. *P. acridens*) 左 left M1(V 13554.1) ;B. 古鼩鼹(未定种) *Palaeoscaptor* sp. 左 left P4(V 13555)

古鼩鼹(未定种) *Palaeoscaptor* **sp.**

(图 1,B)

标本　左 P4 (IVPP V 13555) 。

地点和层位　IVPP Loc. DH 200102;早渐新世狍牛泉组下部。

记述　P4 (V 13555) 的冠面结构形态与 *Palaeoscaptor acridens* 的也很相似。如它的前、后缘明显凹入,颊部和舌部之间的腰很窄。外侧只有一高耸、横向较扁的主尖。后附尖

大,向后颊侧延伸。次尖位于原尖之后,与原尖大小相近,但较低,向后外方斜伸。原尖和次尖间有纵脊连。前附尖明显,但较低。前尖前脊细弱,仅在前尖前基部发育,与前附尖连等。但 V 13555 比 *P. acridens* 的 P4 大得多。P4 测量(L ×W) : 3 ×2.6 (mm) 。

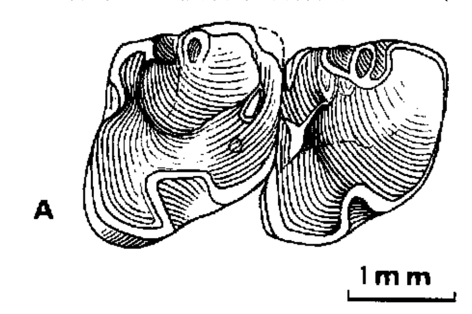
啮齿目 Rodentia Bowdich, 1821

松鼠科 Sciuridae Fischer de Waldheim, 1817

党河鲜松鼠(新属、新种) *Oligosciurus dangheensis* gen. et sp. nov.

(图 2)

正型标本 一段右下颌骨具 m1～2 (IVPP V 13556) 。



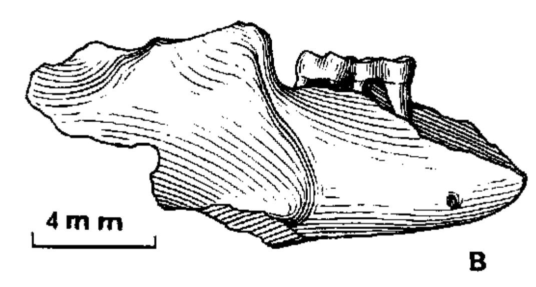


图 2 党河鲜松鼠(新属、新种) 右下颌骨具 m1～2 (V 13556 ,正型标本)

Fig. 2 Right lower jaw with m1～2 (V 13556 , holotype) of *Oligosciurus dangheensis* gen. et sp. nov.

A. 右 right m1～2 冠面观 occlusal view ;B. 右下颌骨颊侧观 lateral view of right lower jaw

地点和层位 IVPP Loc. DH 200102 ; 早渐新世狍牛泉组下部。

特征 个体较小而原始的松鼠。下颌骨咬肌窝前缘位于 m2 下方;冠状突前缘近于垂直,下端起于 m2 后部下方;颏孔位于 p4 后齿根之前。颊齿齿冠很低;臼齿前缘明显窄于后缘,下次尖特别向前外方伸,明显超出下原尖,具明显的下内尖、下次脊和下中附尖,下外脊位置较靠内,无下中尖。

词源 Oligos ,希腊文,鲜,稀罕,贫乏;sciurus ,希腊文 skiouros 的拉丁化词,松鼠。寓意亚洲古近纪的松鼠化石很稀少。Danghe ,党河流域,为化石产地。

描述 下颌骨保存了水平支的中部和部分垂直支。下颌骨骨体较高,咬肌窝明显,位置较靠后,其前缘达 m2 下方。冠状突的前缘较陡,与齿槽缘近于垂直,下端起于 m2 后下方。颏孔位置也较靠后,位于 p4 的前齿根之后。下颌骨上虽只保留有 m1 和 m2 ,但它们的前、后均有齿槽,表明生前有 p4 和 m3 存在。下齿式为 1013。臼齿齿冠很低。m1 和 m2 均为四边形,宽大于长,前缘明显窄于后缘,具 2 齿根。m2 受磨蚀较 m1 的少,冠面的形态结构较清楚。m2 的下三角座短,下后尖虽破损,但保留的部分显示该尖较高。下原尖已磨蚀到基部,明显比下后尖大。下前边脊完全。下后脊往舌侧变细,与下后尖连,封闭小的下齿凹。下跟座较宽大而低。下中附尖横向延伸,与下后尖和下内尖均有沟分开。下次尖特别向前外方伸,往颊侧明显超出下原尖。下内尖发育,与下后边脊明显分开。具下次脊。下外脊完全,位于齿颊侧 1/3 处。该脊磨蚀较深,中部未见膨大处,可能无下中尖。下跟凹开阔平缓,未见釉质褶皱。下外谷横向较深,稍向后内方斜。m1 保存的部分的形态结构与 m2 的很相似,并可见下次脊颊端与下后边

脊连。只是 m1 的尺寸稍小些,下外谷显得窄小些。

测量(L ×AW ×PW) m1, 1.6 ×1.7 ×1.96; m2, 1.8 ×1.8 ×2。

比较与讨论　V 13556 的颊齿齿冠低,结构较简单,具 4 个主尖;下臼齿横宽大于前后长,下三角座短小,下后脊完全,齿尖明显,并围绕宽大而浅的下跟座等特征均与 Sciuridae 的相似。在松鼠科中,V 13556 下臼齿具下次脊的特征仅与北美晚始新世的 *Douglassia* 和渐新世的 *Cedromus* 的相似(Emry and Korth, 1996; Korth and Emry, 1991),而与松鼠科其余的属的不同。但 *Douglassia* 和 *Cedromus* 显然比 V 13556 的大得多,而且下臼齿还具下中尖。此外,V 13556 冠状突前缘近于垂直,其下端起始于 m2 后部,颏孔和咬肌窝前缘的位置较靠后等特征与松鼠科的已知属均不同。显然,V 13556 代表不同于松鼠科已知属的新属、种,被命名为党河鲜松鼠(*Oligosciurus dangheensis*)。

从上面的描述和比较可以看出, *Oligosciurus dangheensis* 的咬肌窝前缘和颏孔的位置较靠后,齿冠和齿脊低,下内尖明显,具下次脊和 2 齿根的特征均为原始特征。特别是它的咬肌窝前缘位于 m2 下方的特征显得比北美的 *Douglassia* 和 *Cedromus* 还要原始些。*Oligosciurus* 是否代表松鼠科的最原始的种类,它与 Sciuridae 科的其他成员究竟是什么关系,或者它在松鼠科中的分类位置如何,都因标本太少,现在无法确认。

梳趾鼠科 Ctenodactylidae Gervais, 1853

西格玛塔塔鼠(相似种) Tataromys **cf.** T. sigmodon **Matthew et Granger, 1923**

(图 3, A,B)

标本　左 M1/2(V 13557.1),右 M1/2(V 13557.2)和左下颌骨具 m1～2 (V 13557.3)。

地点和层位　IVPP Loc. DH 200102; 早渐新世狍牛泉组下部。

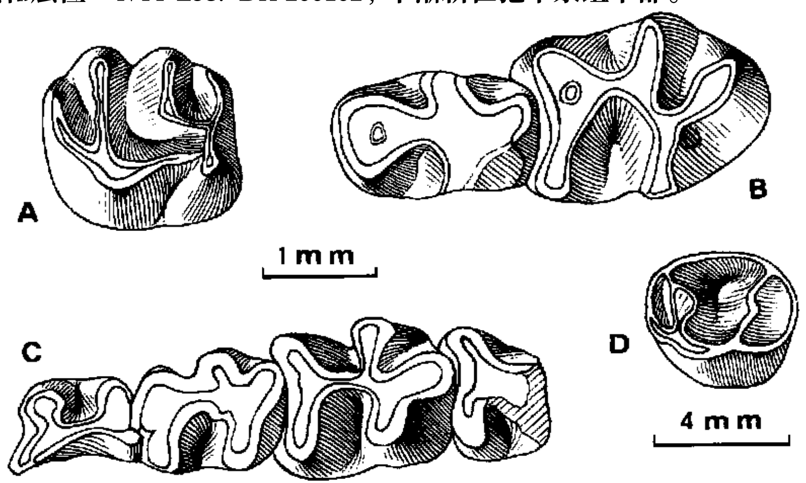


图 3　梳趾鼠类和腔齿鼠颊齿冠面

Fig. 3　Occlusal view of cheek teeth of ctenodactylids and *Coelodontomys*

A～B. 西格玛塔塔鼠(相似种)(*Tataromys* cf. *T. sigmodon*), A. 左 left M1/2(V 13557.1); B. 左 left m1～2 (V 13557.3); C. 退隐卡拉鼠(*Karakoromys decessus*)左 left p4～m3 (V 13558); D. 亚洲腔齿鼠(*Coelodontomys asiaticus*),左 left P4(V 13559)

记述 因上臼齿均为单个牙,无法确定其为 M1 或 M2,此处称其为 M1/2。颊齿齿脊较发达。M1/2 的后脊后弯,与后边脊连。中凹为 L 形。下臼齿下三角座较短。下后脊 II 颊部与下后脊 I 融合,中部不膨大,舌端与下后尖连,封闭小的下三角盆。下外脊位置靠近舌侧,下外凹深。这些特征与 *Tataromys sigmodon* 的均相似。只是党河标本的尺寸超出了该种的变异范围,比 *T. sigmodon* 已知最小的个体还小些。它有可能代表个体较 *T. sigmodon* 小的种,或代表 *T. sigmodon* 的最小个体。但因标本太少,暂将它们作为 *T. sigmodon* 的相似种。

测量(L ×W) M1/2, 1.84 ×1.8; m1, 1.9 ×- ; m2, 2.3 ×1.9。

退隐卡拉鼠 Karakoromys decessus Matthew et Granger, 1923

(图 3, C)

标本 一段左下颌骨具 p4～m2 和 m3 前部(V 13558)。

地点和层位 IVPP Loc. DH 200102; 早渐新世狍牛泉组下部。

记述 颊齿齿冠较低。P4 受压错动变得较窄长,但仍是 X 形。下臼齿下后脊 II 无明显的舌部。下内尖臂不向前斜,而是横向延伸。这些特征均与 *Karakoromys decessus* 的一致,而且颊齿的尺寸也在 *K. decessus* 的变异范围内。

测量(L ×W) p4, 1.3e ×0.9e; m1, 1.4 ×1.2; m2, 1.7 ×1.5; m3, - ×1.3 (AW)。

Tsaganomyidae Matthew et Granger, 1923

亚洲腔齿鼠 Coelodontomys asiaticus Wang, 2001

(图 3, D)

标本 左 P4 (V 13559) 和一段门齿(V 13560)。

地点和层位 IVPP Locs. DH 200103 (V 13559) 和 DH 200102 (V 13560); 早渐新世狍牛泉组下部。

记述 P4 为单面高冠齿,齿根开放不封闭。牙齿的齿质部分很短,髓腔很发达,为圆柱形。齿冠面约为圆形。因该 P4 属较幼年个体,磨蚀较轻,可见 4 条横脊。原脊和后脊往舌侧靠近,分别与原尖的前、后端连接。原脊顶端破损,但仍可见其中部变宽。后脊中部转折,约成 S 形。原尖与前边脊、后边脊和高出的唇缘脊相连形成连续的脊,封闭 3 个唇侧谷。无次尖。这些特征均与 *Coelodontomys* 的一致,而且尺寸也在 *C. asiaticus* 的变异范围内。测量(L ×W): 4.6 ×4。另外,在 DH 200102 地点还有一段门齿(V 13560),它的切面三角形,釉质层表面具纵棱。它可能属 *Tsaganomys* 或 *Coelodontomys*,因尺寸较小,暂归入此属种。

跳鼠科 Dipodidae Fischer de Waldheim, 1817

副蹶鼠(种未定) Parasminthus spp.

标本 P4 两枚(V 13561.1～2), M1(V 13562.1) 和 M1/2 (V 13562.2) 各 1 枚。

地点和层位 IVPP Loc. DH 200102; 早渐新世狍牛泉组下部。

记述 P4 由主尖和后齿带组成,与 *P. asiae-centralis* 和 *P. tangingoli* 的相似。尺寸在 *P. tangingoli* 的变异范围内。V 13562.1 保留了 M1 前部, V 13562.2 保留了 M1/2 后部。

M1/2 **在后边脊与次尖之间不收缩,后脊与次尖连的特征与** *P. parvulus* **的相似,而且上臼齿的尺寸也在** *P. parvulus* **的变异范围内。**

仓鼠科(属种不定) Cricetidae gen. et sp. indet.

在 IVPP Loc. DH 200102 **狍牛泉组下部,还发现了** 1 **枚左** m1 (V 13563) **。它仅保存了牙齿的后半部。**m1 **的下中脊短,有明显的下外中脊的特征均与仓鼠的相似,而与跳鼠的不同。可惜材料太破碎,无法详细鉴定。测量**(PW) :m1, 1.1。

兔形目 Lagomorpha Brandt, 1855

鼠兔科 Ochotonidae Thomas, 1897

戈壁链兔 Desmatolagus gobiensis Matthew et Granger, 1923

(图 4,A,B)

标本　**一段左下颌骨具** p4～m1 (V 13564), 1 **枚左** p4 (V 13565.1), 2 **枚左** m1 (V 13565.2～3) ,**右** m3 (V 13565.4) **和右** p3 (V 13566) **各** 1 **枚** 。

地点和层位　IVPP Locs. DH 200102 (V 13565) ,DH 200103 (V 13564) **和铁匠沟中部** (V 13566); **早渐新世狍牛泉组下部。**

记述　**颊齿齿冠较高,仍具明显的齿根。**p3 **冠面约为三角形,外折较深。**p4 **和下臼齿的下三角座较高而宽。下三角座后缘中部向后的折凸在** p4 **很明显,在** m1 **很弱。下跟座较低而窄。**m3 **的下三角座和下跟座冠面在同一平面上。这些特征均与** *D. gobiensis* **的一致,而且尺寸也在该种的变异范围内。**

测量 (L ×W) p3, 1.1 ×1.3; p4, 2.2 ×2; m1, 2.1 ×2.4, 2 ×2.5, 1.9 ×2; m3, 0.9+ ×0.8+ 。

微型链兔 Desmatolagus pusillus Teilhard de Chardin, 1926

(图 4, C,D)

标本　**一段左上颌骨具** P4～M3 (V 13567.1) **和左** m1 (V 13567.2) 。

地点和层位　IVPP Loc. DH 200102; **早渐新世狍牛泉组下部。**

记述　**个体较** *D. gobiensis* **的小,颊齿为强烈的单面高冠齿。上颊齿为舌侧圆凸的扁柱形,唇侧具齿根,舌侧无齿根。上颊齿的冠面很宽,无次沟或釉质坑,但仍可见新月形谷的痕迹。下臼齿齿根很短。上述特征与** *D. pusillus*

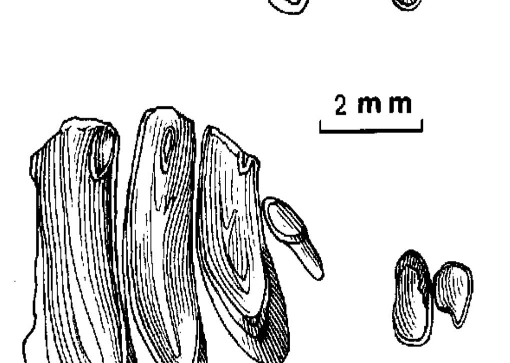


图 4　**链兔颊齿冠面**

Fig. 4　Occlusal view of *Desmatolagus*

A～B. **戈壁链兔** (*Desmatolagus gobiensis*) ,A. **右** right p3 (V 13566); B. **左** left p4～m1 (V 13564); C～D. **微型链兔** (*Desmatolagus pusillus*) ,C. **左** left P4～M3 (V 13567.1) ;D. **左** left m1 (V 13567.2)

成年个体的相似。此外,它们的尺寸也在该种的变异范围内。

测量 M1～3(L),3.3;颊齿(L ×W):P4,1.7 ×5.7;M1,1.4 ×5.2;M2,1.3 ×4;M3,0.5 ×0.8;m1,1.6 ×1.9。

奇蹄目 Perissodactyla Owen, 1848

蹄齿犀科 Hyracodontidae Cope, 1879

异角犀(未定种) Allacerops sp.

(图5,B)

Aprotodon ? sp. 王伴月等,2003,pp. 70,74

标本 一段左下颌骨具 m1(V 13568)。

地点和层位 IVPP Loc. DH 200102;早渐新世狍牛泉组下部。

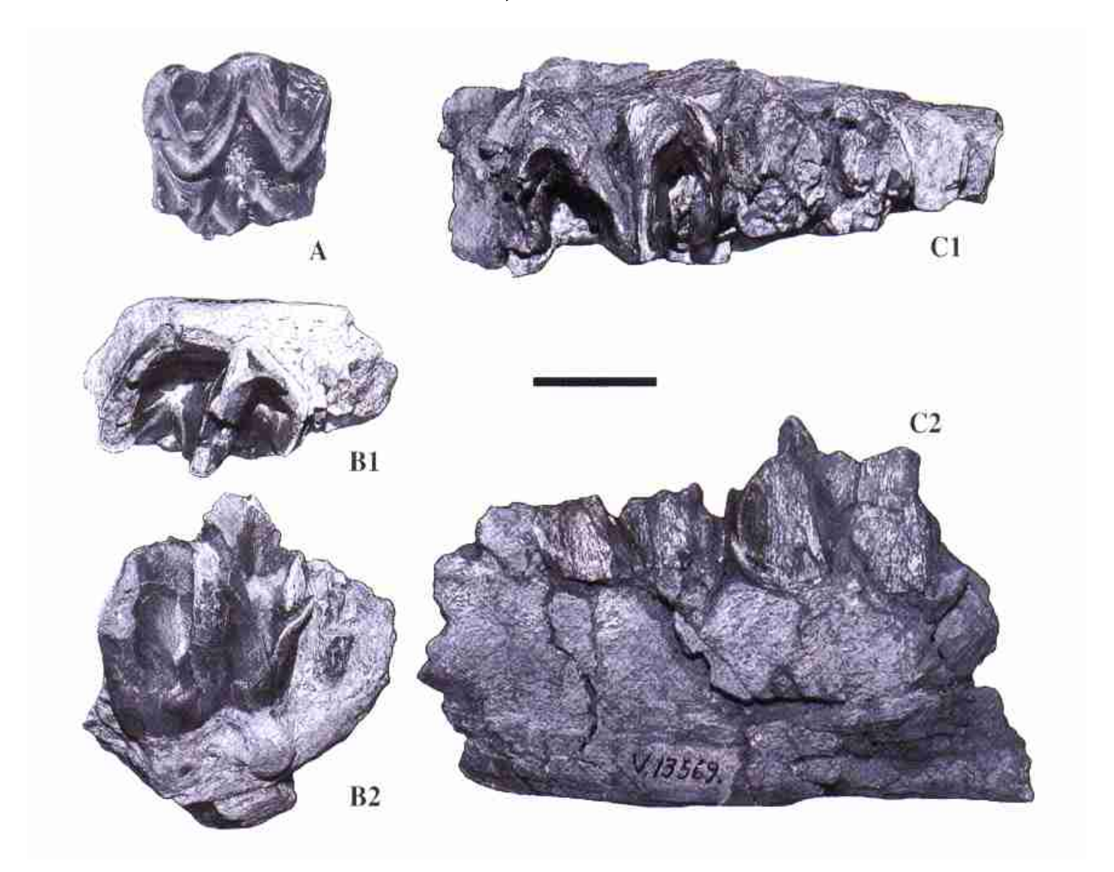


图5 异角犀、裂爪兽和副短齿兽

Fig. 5 *Allacerops*, *Schizotherium* and *Parabrachyops*

A. 副短齿兽(未定种)(*Parabrachyodus* sp.)左 left M1/2 (V 13570),冠面观 occlusal view;B. 异角犀(未定种)(*Allacerops* sp.)左 left m1 (V 13568),B1. 冠面观 occlusal view;B2. 舌面观 lingual view;C. 河套裂爪兽(*Schizotherium ordosium*)一段左下颌骨具 m2～3 和 m1 后半部 a segment of left lower jaw with m2～3 and posterior part of m1 (V 13569.1),C1. 冠面观 occlusal view;C2. 颊侧观 occlusal view,标尺 scale = 2 mm

记述 V 13568 为一幼年个体,m1 正在萌出中。齿冠较高。下三角座明显高于下跟座。下三角座约呈 U 形,下前尖的横脊部分较短而低。下跟座的下次脊微向前弯,其前端在与下三角座后脊外壁相接处明显降低,形成深的切迹。下跟座盆较下三角座盆深。齿带在齿的前缘、后缘发育,在下三角座凹和下跟座凹的基部存在,但在下后尖和下内尖舌侧缺失。因该牙齿的颊侧仍埋在下颌骨中,齿带在颊侧的情况不清楚,牙齿的宽度也无法准确测量。

测量(L ×AW ×PW) 34 ×18.6 + ×19 + 。

V 13568 的上述形态特征与 *Allacerops* 的很相似。*Allacerops* 属已知仅分布中亚地区,目前已知一种,*A. turgaica*,和一相似种(*A.* cf. *A. turgaica*)。它们的 m1 的长度为 22～32.5 mm(Beliajeva, 1954; Reshetov et al., 1993;邱占祥、王伴月,1999)。党河的标本比它们稍大些,而且 m1 下次脊前端下降稍缓,是否属该种,因材料太少,无法确定,暂不定种。

爪兽科 Chalicotheriidae Gill, 1872
河套裂爪兽 *Schizotherium ordosium* Hu, 1959
(图 5,C)

Phyllotillon sp. 王伴月等, 2003, pp. 70, 74

标本 一段左下颌骨具 m2～3 和 m1 后半部 (V 13569.1)和第一指节骨(V 13569.2)。

地点和层位 IVPP Loc. DH 200102; 早渐新世狍牛泉组下部。

记述 V 13569.1 为一较年轻的个体,m3 正在萌出中。m2 的冠面舌部已破损,仅见齿冠为 W 形,齿带在齿的前颊角、后颊角和外沟基部发育,在下原尖和下次尖的颊侧基部缺失。m3 保存较好,它的长度超出宽度的 2 倍。齿冠为 W 形,下后附尖较下后尖低小,有明显的沟与后者分开。下次小尖(第三叶)较大。齿带与 m2 同。

第一指节骨(V 13569.2)的近端关节面强烈前倾,与前面的夹角约为 40°。近端内侧粗隆明显大于外侧的,两粗隆间由纵沟分开。远端滑车面虽大部分破损,但仍可见其滑车中沟宽大而深,其两侧的脊较狭窄。

颊齿测量(L ×AW ×PW) m2, 30.3 ×16.5 ×17.3; m3, 38.6 ×19 ×18。第一指节骨外侧最大长 39 + ,近端最大宽 ×厚,26.5 ×24, 近端关节面处宽 ×厚,24.3 ×24。

上述臼齿的特点与 *Schizotherium* 的一致。在 *Schizotherium* 已知的 6 种中,*S. ordosium* 以个体大而与其余 5 种明显分开(Coombs, 1978)。V 13569 的个体较 *S. ordosium* 的正型标本稍大些,显然大于 *Schizotherium* 的其他 5 种,而与归入该种的产自兰州盆地的 GVL 8710 和内蒙古三盛公的标本的尺寸相近(见 Teilhard de Chardin, 1926; 邱占祥等,1998)。第一指节骨的形态也与兰州的较小的标本(GVL 8713)的相近。V 13569 似应归入 *S. ordosium* 种。

偶蹄目 Artiodactyla Owen, 1848
石炭兽科 Anthracotheriidae Leidy, 1869
副短齿兽(未定种) *Parabrachyodus* sp.
(图 5,A)

Cf. *Sivameryx* sp. 王伴月等, 2003, pp. 70, 74

标本 左 M1/2 (V 13570)。

地点和层位 IVPP Loc. DH 200102; 早渐新世狍牛泉组下部。

记述 V 13570 为单个上臼齿,可能是 M1 或 M2,因无法确定其位置,暂称为 M1/2。M1/2 齿冠很低,具 5 齿尖。前尖和后尖均为新月形,外壁强烈内凹,具明显的前尖肋和后尖肋。前尖后臂和后尖前臂相连形成很发达的、向外拱出的中附尖。前附尖也很发达,但较中附尖小。后附尖最小。原小尖明显,为丘形。原尖和后小尖均破损,但可见原尖的后外脊和后小尖的前外脊。中横谷宽而深,谷内釉质层褶皱明显。有前、后齿带,后尖外侧也有齿带。M1/2 长: 29.6 mm。V 13570 的上述特征与 *Parabrachyodus* 的一致。*Parabrachyodus* 仅已知 1 种,即产于巴基斯坦 Bugti 地点的 *P. hyopotamoides* (Lydekker, 1883)。而产该化石的 Chitarwata 组 Bugti 段的时代为早 - 晚渐新世(见 Welcomme et al., 2001)。党河标本的齿冠显然比该种低得多,前尖和后尖的 V 形外壁特别强烈地向内凹入,前尖肋和后尖肋也弱小得多。这些区别特征均为较原始的特征。此外,如果 V 13570 是 M1,其尺寸与该种的大小相近,如果是 M2,则比该种小得多。无论如何,V 13570 很可能代表较 *P. hyopotamoides* 原始的种。但因材料太少,暂不定种。

2 讨论

在党河下游地区狍牛泉组下部发现的化石共有 11 属 14 种,代表 5 目 10 科: *Palaeoscaptor* cf. *P. acridens*、*Palaeoscaptor* sp.、*Oligosciurus dangheensis* gen. et sp. nov.、*Tataromys* cf. *T. sigmodon*、*Karakoromys decessus*、*Coelodontomys asiaticus*、*Parasminthus* spp.、*Cricetidae* gen. et sp. indet.、*Desmatolagus gobiensis*、*D. pusillus*、*Allacerops* sp.、*Schizotherium ordosium* 和 *Parabrachyodus* sp.。我们称它们为叮当沟动物群(王伴月等, 2003)。这些化石的绝大多数都是亚洲早渐新世地层中常见的属种。其中 *Karakoromys decessus*、*Coelodontomys asiaticus*、*Desmatolagus gobiensis* 和 *Allacerops* 的已知时代分布限于早渐新世。*Tataromys sigmodon*、*Desmatolagus pusillus*、*Schizotherium ordosium* 和 *Parabrachyodus* 的时代为早渐新世晚期到晚渐新世。*Palaeoscaptor* 和 *Parasminthus* 的产出时代主要是渐新世,但可能延续到早中新世。综合分析上述各类的时代分布,党河产叮当沟哺乳动物群的地层(狍牛泉组下部)的时代可能为早渐新世,并以早渐新世晚期为宜。

致谢 参加野外考察的还有美国洛杉矶自然历史博物馆的王晓鸣,中国科学院古脊椎动物与古人类研究所的邱铸鼎、邓涛、冯文清,甘肃省考古所的谢骏义,甘肃省博物馆的颉光普,甘肃省和政古动物化石博物馆的陈善勤和美国北亚里桑那大学地质系的 W. Downs 等先生,插图由沈文龙先生绘制,照片由邓涛先生摄制,诚致谢意!

DISCOVERY OF EARLY OLIGOCENE MAMMALIAN FOSSILS FROM DANGHE AREA, GANSU, CHINA

Wang Ban-Yue QIU Zhan-Xiang
(*Institute of Vertebrate Paleontology and Paleoanthropology*, *Chinese Academy of Sciences* Beijing 100044)

Key words Danghe area, Gansu Province, Oligocene, mammals

Summary

The lower reach of the Danghe River [= Taben-buluk area of Bohlin (1942)] is one of the classic areas of late Oligocene in the Asian Paleogene biostratigraphy (Bohlin, 1942, 1946). In 1999 and 2001 a joint team of Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences (IVPP), Institute of Cultural Relics and Archaeology, Gansu, and Provincial Museum of Gansu made a geologic survey of the Danghe area. During the survey some new mammalian fossils of early Oligocene were found. The new find indicates that the Danghe Basin received its Cenozoic deposits from early Oligocene rather than late Oligocene as previously thought. All of the specimens described here are collected from the lower part of the Paoniuquan Formation in the Tiejianggou valley, Aksay Kazak Autonomous County, Gansu Province.

1 Systematics

Erinaceomorpha Gregory, 1910
Erinaceidae Fischer de Waldheim, 1817
Palaeoscaptor **cf.** *P. acridens* **Matthew et Granger, 1924**
(Fig. 1, A)

Specimens A left M1 (V 13554.1), a right P3 and a left P4 (V 13554.2～3) from IVPP Loc. DH 200102.

Remarks M1 is rather short and wide and has a distinct paraconule, which are similar to *Palaeoscaptor acridens* rather than *Amphechinus*. However, V 13554.1 is smaller than the type of *Palaeoscaptor acridens* in size.

Palaeoscaptor **sp.**
(Fig. 1, B)

Specimen A left P4 (IVPP V 13555) from IVPP Loc. DH 200102.

Remarks The P4 is similar to that of *Palaeoscaptor acridens* in having concave anterior and posterior margins and narrow waist. However, it is much larger than *P. acridens* in size.

Rodentia Bowdich, 1821
Sciuridae Fischer de Waldheim, 1817
Oligosciurus dangheensis **gen. et sp. nov.**
(Fig. 2)

Holotype A segment of right lower jaw with m1～2 (IVPP V 13556) from IVPP Loc. DH 200102.

Diagnosis Small-sized and primitive sciurid; anterior margin of masseteric fossa below m2, near vertical anterior margin of coronoid process rising from posterior part of m2; mental foramen lo-

cated anterior to posterior root of p4; cheek teeth very low crowned; lower molars with narrower anterior side than the posterior side, extending anterobuccally hypoconid more protrusive than protoconid, distinct entoconid, hypolophid and mesostylid, more lingually located ectolophid, and without mesoconid.

Etymology Oligos, Greek, few, scanty; sciurus, Latin, squirrel from Greek skiourus. Danghe valley is the area where the fossils were collected.

Description The horizontal branch of the lower jaw is high. The anterior margin of the distinct masseteric fossa is located below m2. The rather steep anterior margin of the coronoid process rises from posterior part of m2. The mental foramen is located anterior to the posterior root of p4. The lower dental fomula: 1013. The cheek teeth are very low crowned. The m1 and m2 are trapezoid in occlusal view, wider than length and anterior margin narrower than posterior one, and have similar occlusal pattern. The m2 is less worn than m1 and shows short trigonid, high metaconid and large protoconid. The anterolophid is complete. The metalophid meets the metaconid to close the small trigonid basin. The transversely extending mesostylid is separated from the metaconid and entoconid. The extending anterobuccally hypoconid is more protrusive than the protoconid. The well-developed entoconid is separated from the posterolophid. The hypolophid is present. The complete ectolophid is located rather lingually and without mesoconid. The talonid basin is broad and smooth. The buccal valley extends postero-lingually.

Dimensions (see Chinese text)

Comparison and discussion The cheek teeth of V 13556 are brachydont, of simple occlusal pattern, with four main cuspids. The lower molars are wider than long, with narrow and short trigonid, complete metalophid, and distinct cuspids around the wide and shallow talonid. All these features are identical with those of the Sciuridae. The lower molars of V 13556 has a hypolophid, similar to *Douglassia* from late Eocene and *Cedromus* from Oligocene in North America, rather than other sciurids. However, V 13556 is different from *Douglassia* and *Cedromus* in being much smaller in size, and in lacking mesoconid. In addition, V 13556 differs from all known sciurids, including *Douglassia* and *Cedromus*, in having a nearly vertical anterior margin of the coronoid process, more posteriorly located mental foramen and masseteric fossa. It seems that V 13556 represents a new genus and species distinct from all known sciurids, named here as *Oligosciurus dangheensis*. The above mentioned features of *Oligosciurus danheensis* are primitive in nature. Probably *O. dangheensis* represents a primitive species of the Sciuridae.

Ctenodactylidae Gervais, 1853

Tataromys **cf.** T. sigmodon **Matthew et Granger, 1923**

(Fig. 3, A, B)

Specimens 2 M1/2 (V 13557.1～2) and a segment of left lower jaw with m1～2 (V 13557.3) from IVPP Loc. DH 200102.

Remarks The M1/2 is more lophodont. The metaloph bends posteriorly to meet the posteroloph. The mesosinus is L-shaped. The lower molars have short trigonid. The lingual parts of the metalophiod I and II are fused and the trigonid is closed. The ectolophid is lingually located. All the features are identical with those of *Tataromys sigmodon*. But V 13557 is smaller than those of *T. sigmodon*.

Karakoromys decessus **Matthew et Granger, 1923**

(Fig. 3, C)

Specimen A segment of left lower jaw with p4～m2 and anterior part of m3 (V 13558) from IVPP Loc. DH 200102.

Remarks The cheek teeth are brachydont. The rather posteriorly extending metalophid II has no lingual part on the lower molars. The arm of the entolophid is transverse. The features are identical with those of *K. decessus*. The cheek teeth are within the range of the species in size.

Tsaganomyidae Matthew et Granger, 1923

Coelodontomys asiaticus **Wang, 2001**

(Fig. 3, D)

Specimens Left P4 (V 13559) from DH 200103 and a segment of incisor (V 13560) from DH 200102.

Remarks The P4 is strongly unilateral hypsodont with open root, very short dentine part and well-developed cylindrical pulp cavity. The enamel on the occlusal surface is slightly thick. The young P4 shows four transverse lophs and protoloph and metaloph convergent to protocone. They are the features of *Coelodontomys asiaticus*. The P4 is within the range of this species in size.

Dipodidae Fischer de Waldheim, 1817

Parasminthus **spp.**

Specimens 2 P4 (V 13561.1～2), 1 M1 (V 13562.1) and 1 M1/2 (V 13562.2) from IVPP Loc. DH 200102.

Remarks The P4 is composed of a main cusp and posterior cingulum. It is similar to that of *Parasminthus asiae-centralis* and *P. tangingoli*. Its size is within the range of *P. tangingoli*. The M1/2 are similar to *Parasminthus parvulus* in lacking concavity between the hypocone and posteroloph on the posterior wall, and being small sized.

Cricetidae gen. et sp. indet.

From IVPP Loc. DH 200102 a part of a left m1 (V 13563) is similar to Cricetidae in having short mesolophid and distinct ectomesolophid.

Lagomorpha Brandt, 1855

Ochotonidae Thomas, 1897

Desmatolagus gobiensis **Matthew et Granger, 1923**

(Fig. 4, A, B)

Specimens A segment of left lower jaw with p4～m1 (V 13564) from IVPP Loc. DH 200103; 1 left p4 (V 13565.1), 2 left m1 (V 13565.2～3), 1 right m3 (V 13565.4) from DH 200102; and a right p3 (V 13566) from middle part of the Tiejianggou.

Remarks The cheek teeth have high crown and distinct roots. The triangular p3 has a deep external reentrant. The talonid is narrower and lower than the trigonid on p4～m1. The occlusal features and the size of the cheek teeth are identical with those of *Desmatolagus gobiensis*.

Desmatolagus pusillus **Teilhard de Chardin, 1926**

(Fig. 4, C, D)

Specimens A segment of left upper jaw with P4～M3 (V 13567.1) and one left m1 (V 13567.2) from IVPP Loc. DH 200103.

Remarks The cheek teeth have higher crown and smaller size than *D. gobiensis*. The upper cheek teeth are strong unilateral hypsodont, with buccal roots, but without lingual root. Having been strongly worn the occlusal surface of the upper cheek teeth became much wide and has a vestige of crescent valley, but has no distinct hypostria or enamel lake. The lower molar has very short root. All of these are identical with *D. pusillus*. In addition, they are within the range of those of the species in size.

Perissodactyla Owen, 1848

Hyracodontidae Cope, 1879

Allacerops sp.

(Fig. 5, B)

Aprotodon ? sp. Wang et al., 2003, pp. 70, 74

Specimen A segment of left lower jaw with m1 (V 13568) from IVPP Loc. DH 200102.

Remarks The m1 is rather high-crowned. The trigonid, higher than the talonid, is U-shaped, with a short transverse anterior part of the paralophid. The anterior end of the hypolophid descends apparently before reaching the posterior wall of the metalophid, leaving a distinct cleft between the trigonid and talonid. The talonid basin is deeper than the trigonid one. These features are similar to those of *Allacerops*. *Allacerops* is known to include *A. turgaica* and *A.* cf. *A. turgaica* from Central Asia. However, the m1 of the present specimen is larger than that of the two other species in size.

Chalicotheriidae Gill, 1872

Schizotherium ordosium **Hu, 1959**

(Fig. 5, C)

Phyllotillon sp. Wang et al., 2003, pp. 70, 74

Specimens A segment of left lower jaw with m2～3 and posterior part of m1 (V 13569.1) and a phalange I (V 13569.2) from IVPP Loc. DH 200102.

Remarks The m3 is similar to that of *Schizotherium* in having separated metastylid and metaconid and a well-developed hypoconulid. Among the 6 known species of *Schizotherium*, *S. ordosium* is the largest one. The size of the specimens from Danghe area falls within the variation range of *S. ordosium* and larger than all the others. The phalange I is also similar to that of *S. ordosium* in having a strongly anteriorly inclined proximal articular surface.

Artiodactyla Owen, 1848

Anthracotheriidae Leidy, 1869

Parabrachyodus **sp.**

(Fig. 5, A)

Cf. *Sivameryx* sp. Wang et al., 2003, pp. 70, 74

Specimen A left M1/2 (V 13570) from IVPP Loc. DH 200102.

Remarks The M1/2 is brachydont and has five main cusps. The paracone and metacone are V-shaped with deeply concave external surfaces and distinct paracone rib and metacone rib. The well-developed mesostyle is arched externally. The prominent parastyle is smaller than the mesostyle but larger than the metastyle. The conic protoconule is distinct. The middle transverse valley is broad and covered with distinct wrinkles. These features are very similar to those of *Parabrachyodus*. *Parabrachyodus* is known to be represented only by the type species, *P. hyopotamoides* from Bugti of Pakistan. V 13570 is different from *P. hyopotamoides* in having lower crown, more deeply concave external walls of paracone and metacone, and smaller paracone and metacone ribs. All these features are primitive. Probably V 13570 may represent a species more primitive than *P. hyopotamoides*. However, the specimen is too poor to be established as a new species.

2 Discussion

The lower part of the Paoniuquan Formation of the Danghe area yielded 14 species of 11 genera, representing 10 families of 5 orders: *Palaeoscaptor* cf. *P. acridens*, *Palaeoscaptor* sp., *Oligosciurus dangheensis* gen. et sp. nov., *Tataromys* cf. *T. sigmodon*, *Karakoromys decessus*, *Coelodontomys asiaticus*, *Parasminthus* spp., *Cricetidae* gen. et sp. indet., *Desmatolagus gobiensis*, *D. pusillus*, *Allacerops* sp., *Schizotherium ordosium*, and *Parabrachyodus* sp. This fauna was called as Dingdanggou Mammalian Fauna (Wang et al., 2003). Most of the taxa often occur in the early Oligocene in Asia. *Karakoromys decessus*, *Coelodontomys asiaticus*, *Desmatolagus gobien-*

sis and *Allacerops* are known to occur only in the early Oligocene. *Tataromys sigmodon* , *Desmatolagus pusillus* , *Schizotherium ordosium* and *Parabrachyodus* are known to range from late early Oligocene through late Oligocene. *Palaeoscaptor* and *Parasminthus* occur mainly in Oligocene and may survive in the early Miocene. It seems that the mammalian fauna from the lower part of the Paoniuquan Formation is of early Oligocene in age , probably late early Oligocene , based on the fauna mentioned above.

References

Beliajeva E I , 1954. Some data on Oligocene Rhinocerotoidea of Mongolia. Tr Paleont Inst , **55** : 190～205 (in Russian)

Bohlin B , 1942. The fossil mammals from the Tertiary deposits of Taben-buluk , Western Kansu , Part I : Insectivora and Lagomorpha. Palaeont Sin , New Ser C , (8a) : 1～113

Bohlin B , 1945. Palaeontological and geological researches in Mongolia and Kansu 1929-1933. Sino-Swedish Expedition Publication , **26** : 257～325

Bohlin B , 1946. The fossil mammals from the Tertiary deposit of Taben-buluk , Western Kansu , Part II : Simplicidentata , Carnivora , Artiodactyla , Perissodactyla , and Primates. Palaeont Sin , New Ser C , (8b) : 1～259

Bohlin B , 1960. Geological reconnaissances in Western Kansu and Kokonor. Sino-Swedish Expedition Publication , **44** : 1～79

Coombs M C , 1978. Additional *Schizotherium* material from China , and a review of *Schizotherium* dentitions (Perissodactyla , Chalicotheriidae). Am Mus Novit , (2647) : 1～18

Emry R J , Korth W W , 1996. The Chadronian squirrel " *Sciurus* " *jeffersoni* Douglass , 1901 : a new generic name , new material , and its bearing on the early evolution of Sciuridae (Rodentia). J Vert Paleont , **16** (4) : 775～780

Korth W W , Emry R J , 1991. The skull of *Cedromus* and a review of the Cedromurinae (Rodentia , Sciuridae). J Paleont , **65** (6) : 984～994

Li C K, Ting S Y, 1983. The Paleogene mammals of China. Bull Carnegie Mus Nat Hist , **21** : 1～93

Lydekker R , 1883. Indian Tertiary and post-Tertiary vertebrata. Part 5. Siwalik selenodont suina , etc. Palaeont India , Ser 10 : 1～36

Qiu Z D(邱铸鼎) , 1996. Middle Miocene micromammalian fauna from Tunggur , Nei Mongol. Beijing : Science Press. 1～216 (in Chinese with English summary)

Qiu Z X(邱占祥) , Wang B Y(王伴月) , 1999. *Allacerops* (Rhinocerotoidea , Perissodactyla) , its discovery in China and its systematic position. Vert PalAsiat(古脊椎动物学报) , **37** (1) : 48～61 (in Chinese with English summary)

Qiu Z X(邱占祥) , Wang B Y(王伴月) , Xie J Y(谢骏义) , 1998. Mid-Tertiary chalicothere (Perissodactyla) fossils from Lanzhou , Gansu , China. Vert PalAsiat(古脊椎动物学报) , **36** (4) : 297～318 (in Chinese with English summary)

Reshetov V , Spassov N , Baishashov B , 1993. *Tenisia* gen. nov. : Taxonomic revaluation of the Asian Oligocene rhinocerotoid *Eggysodon turgacum* (Borissiak , 1915) (Mammalia , Perissodactyla , Hyracodontidae). Geobios , **26** (6) : 715～722

Rich T H V , 1981. Origin and history of the erinaceinae and brachyericinae (Mammalia , Insectivora) in North America. Bull Am Mus Nat Hist , **171** (1) : 1～116

Teilhard de Chardin P , 1926. Description de Mammifères Tertiaires de Chine et de Mongolie. Ann Paléont , **15** : 1～52

Tong Y S(童永生) , Zheng S H(郑绍华) , Qiu Z D(邱铸鼎) , 1995. Cenozoic mammal ages of China. Vert PalAsiat(古脊椎动物学报) , **33** (4) : 290～214 (in Chinese with English summary)

Wang B Y (王伴月) , 1997a. Chronological sequence and subdivision of Chinese Oligocene mammalian faunas. J Stratigr(地层学杂志) , **21** (3) : 183～191 (in Chinese with English abstract)

Wang B Y, 1997b. The mid-Tertiary Ctenodactylidae (Rodentia , Mammalia) of eastern and central Asia. Bull Am Mus Nat Hist , **234** : 1～88

Wang B Y(王伴月) , Qiu Z X (邱占祥) , Wang X M(王晓鸣) , et al. , 2003. Cenozoic stratigraphy in Danghe area , Gansu Province , and uplift of Tibetan Plateau. Vert PalAsiat(古脊椎动物学报) , **41** (1) : 66～75 (in Chinese with English summary)

Wang X M , Wang B Y, Qiu Z X, et al. , 2003. Danghe area (western Gansu , China) biostratigraphy and implications for depositional history and tectonics of northern Tibetan Plateau. Earth Planetary Sci Letters , **208** : 253～269

Welcomme J -L , Benammi M , Crochet J -Y et al. , 2001. Himalayan forelands : palaeontological evidence for Oligocene detrital deposits in the Bugti Hills (Balochistan , Pakistan). Geol Mag , **138** (4) : 397～405